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A COMPREHENSIVE WATER POLLUTION CONTROL PROGRAM FOR THE RAINY RIVER BASIN

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Water Pollution Series No. 68

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A COMPREHENSIVE PROGRAM FOR WATER POLLUTION CONTROL

for the

RAINY RIVER BASIN

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Springfield VA 22151

U. S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service

A COMPREHENSIVE WATER POLLUTION CONTROL PROGRAM

for the

RAINY RIVER BASIN

Developed by the State Water Pollution Control Agency

of

MINNESOTA

Adopted by

U. S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE
Public Health Service

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FOREWORD

Our country's development over the past 50 years has been marked by tremendous progress in many fields. It has made possible great gains in the health, comfort, and well-being of the people. But it has not been without cost. Part of the cost has been the damage to the Nation's water resources that has resulted from wastes discharged to the streams by our growing cities and industries. All water uses have been affected--public water supplies, recreation, agriculture, industry, fish and aquatic life.

In enacting the Federal Water Pollution Control Act in 1948, the Congress declared that "water pollution has become a matter of grave concern in many areas and its damaging effects on the public health and national resources are a matter of definite Federal concern as a menace to national welfare. Abatement must be undertaken in order to control it."

The Public Health Service, as part of its responsibilities under this Act, is required to prepare or adopt, in cooperation with other Federal agencies, State and interstate water pollution control agencies, and municipalities and industries, comprehensive programs for the abatement of pollution.

This publication summarizes the "Comprehensive Water Pollution Control Program for the Rainy River Basin" of the Minnesota State water pollution control agency. The program is sound and gives full consideration to the several present uses and to the reasonably anticipated future uses of the waters of the basin. It provides an equitable balance in the pollution control requirements for various private and public groups concerned.

I am pleased, therefore, in my capacity as Surgeon General of the Public Health Service, to adopt the program developed by the Minnesota water pollution control agency as a comprehensive program which fully meets the requirements of the Federal Water Pollution Control Act.

This program is based on beneficial water uses and related conditions that prevailed on August 1, 1953. Comprehensive programs for pollution control must necessarily be flexible. They must allow for growth, development, and changing conditions. Any significant changes affecting water quality, such as stream flow, water use, industrial development, population, etc., may require changes in the pollution control program.

Obviously the mere adoption of the program will not in itself reduce pollution or improve the usefulness of the waters of this basin. It does provide to the citizens of the area and to the city officials and industrial leaders, farmers, fishermen, conservationists, and others an objective plan based on good engineering practice and reflecting sound economics. It is a plan which the public can support, and must support, if progress is to be made in the abatement of pollution.

Certain additional considerations beyond the mere acceptance of a plan are essential to its successful execution. The citizens of the areas affected must see that sufficient resources are provided to the State water pollution control agencies concerned to enable them to make the technical investigations necessary to aid those responsible for constructing pollution abatement works.

We must recognize, too, that in order to be fully effective the plans and programs of one State must be geared closely to those of adjoining States, since State boundaries are no barrier to pollution traveling in interstate streams. Above all, no program of this nature can progress beyond the report stage if its meaning and purpose are not made clear and understandable to the citizens of the area. In the final analysis they are the ones who will pay, directly or indirectly, for the pollution abatement works needed.

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It is my hope that this program for the Rainy River Basin will be carried through to completion as soon as possible so that the area may enjoy all the benefits that clean water can provide, in health and recreational opportunities for the people and in sound growth of industry and agriculture.

Leonard A. Scheele

Leonard A. Scheele
Surgeon General

INTRODUCTION

This comprehensive program for the Rainy River Basin concerns the American portion of the basin and is based on data supplied by the Minnesota State Department of Health, Section of Water Pollution Control, for this basin. State and Federal reports of investigations and studies of this river have been prepared or published and have considered present and anticipated future water uses, the quality of water necessary to permit these uses, sources of pollution and their effects on the receiving waters and water uses, benefits derived from abatement of pollution, and needed pollution abatement facilities. These reports upon which this program is based are as follows:

1. Upper Mississippi Drainage Basin Report--Cooperative Report by Public Health Service and water pollution control agencies of Illinois, Indiana, Iowa, Minnesota, Missouri, North Dakota, South Dakota, and Wisconsin (1951). Area concerned--entire drainage basin with separate sections for individual drainage areas, one of which is the Rainy River Basin. Available through the Public Health Service, Upper Mississippi and Great Lakes Drainage Basins Office.

2. Report on Preliminary Survey of Pollution of Rainy River--Report of investigation by Minnesota State Department of Health, Division of Water Pollution Control (August 18-25, 1952). Area concerned is the main stem of the Rainy River from Rainy Lake to Lake of the Woods. Reference copy on file with the Minnesota State Department of Health and the Upper Mississippi and Great Lakes Drainage Basins Office, Public Health Service.

RAINY RIVER BASIN

GENERAL REFERENCE MAP

U.S. DEPARTMENT OF
HEALTH EDUCATION AND WELFARE
Public Health Service

GENERAL DESCRIPTION

The Rainy River Basin lies in Ontario and in the north central part of Minnesota and includes part of the Lake of the Woods. The river forms a portion of the boundary between Canada and Minnesota. The drainage area extends approximately 220 miles along the east-west line and measures about 150 miles in a north-south direction. The total basin area is approximately 21,000 square miles. About 11,300 square miles lie within Minnesota and the other 9,700 in Ontario.

The climate is characterized by wide variations in temperature with average January temperatures about 6° F. and average July temperatures about 63° F. Temperature extremes range from 50° F. below zero to 100° F. above. The mean annual precipitation is about 25 inches. The growing season is only about 110 days long.

Stream flows in the Rainy River and its tributaries vary widely. The average discharge of the Rainy River during 1934-46 was 12,340 cubic feet per second with a maximum of 65,000 and a minimum of 2,200. Mean flows of the tributaries range from 66 to 910 cubic feet per second. Minimum flows on some tributaries have been zero or very near it. These wide variations in flows have a serious effect on the amount and quality of water available for various purposes and on the ability of the streams to receive and assimilate polluting materials.

Water Use and Water Quality Objectives

One Ontario and three Minnesota municipalities in the basin, with a combined population of about 15,000, use surface water for their municipal supplies. In addition, a large number of people temporarily residing in resorts during the summer months obtain their domestic water from rivers or lakes. The surface waters are also used for ice supply. Rainy River is a source of industrial water supply for the paper companies located at International Falls, Minnesota, and Fort Frances, Ontario.

MINNESOTA MUNICIPAL WATER SUPPLIES IN BASIN

Municipality	Population	Source of Supply
Baudette	929	Wells
Big Falls	441	Wells
Big Fork	463	Wells
Cook	482	Wells
Ely	5,474	Burntside Lake
International Falls	6,269	Rainy River
Little Fork	671	Wells
Orr	309	Wells
South International Falls	1,840	Rainy River
Spooner	420	Wells
Tower	773	Wells
Warroad	1,276	Wells

The tourist trade is a significant summer industry in this region. Boating, swimming, and fishing in the many lakes and rivers are popular pastimes. Commercial fishing is important in the boundary waters which ranked fifth in production in the United States fresh-water lakes in 1949. Navigation, consisting principally of fishing vessels and recreational craft, is practiced along the boundary waters in the basin. Hydroelectric developments are located at International Falls on the Rainy, and at Winton, Minnesota, on the Kawishiwi.

Portions of the western section of the basin are under cultivation with some dairy and livestock production. The short growing season and lack of large markets limit agricultural development. A part of the stream turbidity is the result of soil erosion on cultivated land. At present, about 20 percent of the watershed is organized into soil conservation districts.

The principal industries in the basin are iron ore mining, timber and pulpwood cutting, pulp and paper manufacture, commercial fishing and resort business. Fur trapping and guide service for fishermen and hunters are also sources of income to the area.

The water pollution control agencies of Minnesota and Ontario work very closely together in their efforts to obtain pollution abatement.

The Manual of Recommended Water Sanitation Practice, Public Health Service Bulletin No. 296, 1946, recommends specific criteria for municipal water supplies and is used as a guide by the waterworks profession and State health agencies.

Quality objectives for the bacteriological quality of bathing waters recommended by the Joint Committee on Bathing Places (joint study by American Public Health Association and Conference of State Sanitary Engineers), together with sanitary surveys, are used in the administration of pollution control programs as related to bathing waters.

Water quality objectives for fishing waters vary with the type of aquatic life to be protected. The general objectives advocated by the U. S. Fish and Wildlife Service calling for a balanced aquatic life habitat and limiting concentrations of pollutional substances are usually used by authorities in this basin.

The controlling water quality criteria for the basin are those necessary for the protection of the water supplies of municipalities, recreational centers, fishing and hunting camps, and private domestic users which are dependent on the surface waters as a source of water and ice. Other controlling criteria vary with the use to which the waters are put, with special emphasis on the protection of bathing and recreational use and maintaining suitable fish habitat.

Sources and Effects of Pollution

As shown in the following table, the basin contains 13 municipalities with sewer systems which serve a total population of about 28,000. As a result of the programs of the Minnesota and Ontario pollution control agencies, 11 of these municipalities provide treatment for their sewage. The strength of the municipal wastes is reduced about 30 percent by this treatment.

STATUS OF SEWAGE DISPOSAL OF MUNICIPALITIES

Municipality	Population	Sewers	Degree of Treatment
Baudette	929	Yes	Primary
Big Falls	441	None	--
Big Fork	463	None	--
Cook	482	Yes	Primary
Ely	5,474	Yes	Primary*
Fort Frances, Ontario	8,700	Yes	None
International Falls	6,269	Yes	None
Little Fork	671	Yes	Primary
Orr	309	Yes	Secondary
Rainy River, Ontario	1,250	Yes	Primary
Soudan	300	Yes	Primary
South International Falls	1,340	None	--
Spooner	420	Yes	Connected to Baudette
Tower	773	Yes	Primary
Warroad	1,276	Yes	Primary
Williams	414	Yes	Primary

*Secondary treatment facilities under construction

The Town of Fort Frances, Ontario, still has not constructed a sewage treatment plant. A site for this has been selected, and sewers are being planned to carry the sewage to this point. Some time ago, a consulting engineer's report was secured, but this would need revision now insofar as cost is concerned. The municipality has not found it convenient to proceed with the financing of this measure.

The Town of Rainy River has a partial sewage treatment plant. This requires alteration and enlargement. No action has been taken to date to put into effect plans for this installation. No decision has been reached on this project.

These are the only two sewered municipalities on the Canadian side of the Rainy River. Some drains exist at other small communities, but they are of minor significance.

Industrial wastes are discharged to municipal sewers in most cases except for the large pulp and paper plants which have independent outlets. The pulp and paper mills have installed waste prevention equipment which is capable of removing a large portion of the bark and coarse wood fiber. The polluting organic material from the chemical pulp process is not treated by this equipment, and the waste being discharged to Rainy River is estimated to have an oxygen demand equivalent to sewage from a population of about 600,000 (based on .017 lb. oxygen per capita per day). Since the activities of the Canadian paper mill are closely related to activities of the mill on the United States side, it is anticipated that the treatment of these wastes will proceed jointly.

The most serious pollution damage in the basin occurs in the Rainy River between Rainy Lake and Lake of the Woods and in the Lake of the Woods at the mouth of the Rainy River. This pollution is caused by municipal and industrial wastes discharged into Rainy River below Rainy Lake. Localized pollution of Shagawa Lake will be corrected when work now under way on a municipal sewage treatment plant at Ely is completed.

The largest sources of pollution are International Falls, Minnesota, Fort Frances, Ontario, and the two paper companies. The entire river below these municipalities is affected to such a degree that the water is unsatisfactory for public water supply, commercial and sports fishing, and other recreational use.

The pulp and paper mills discharge wood fiber and wood solids which cause extensive deposits of wood fiber and solids throughout the length of the river between Rainy Lake and Lake of the Woods. These conditions in the water interfere with recreational uses of the river and reduce its esthetic values. Rainy River is considered by commercial fishermen to be one of the largest spawning beds for Lake of the Woods fish. Although definite information is not available on the effects of paper mill wastes on fish life in the Rainy River or Lake of the Woods, it is thought that fiber and wood solids deposits are harmful to the spawning effectiveness of fish and to the quality of fish food in those areas where the bottom is covered.

WATER POLLUTION CONTROL PROGRAM

The water pollution control agencies of Minnesota and Ontario have been aware of the pollution problems in the Rainy River Basin as indicated by a public meeting held at Fort Frances in 1951 on the pollution of Rainy River and by the number of sewage treatment plants now operating in the basin. A comprehensive water pollution control program is now in effect in the basin.

Much has already been accomplished toward the completion of this program as is evidenced by the fact that 11 of the 13 sewered municipalities provide treatment of their waste. In addition, both of the pulp and paper mills, which are the major sources of industrial waste, have installed waste prevention equipment and are actively studying ways to reduce further their fiber and wood solids wastes. However, the program calls for some additional water pollution prevention and abatement facilities and recognizes the need for improved operation of some existing waste treatment works.

The program of the Minnesota State Department of Health, and Water Pollution Control Commission, which concerns that portion of the basin within the United States, is described below. However, to make the program effective throughout the entire basin a similar program is needed for the treatment of wastes from the Canadian portion of the basin.

The Minnesota program is firmly based upon the findings of stream studies, surveys, and investigations as reported in the introduction. The corrective measures were determined only after a thorough consideration of all existing beneficial water uses in the basin as well as those which might materialize in the immediate foreseeable future, and are intended to restore, preserve, and protect the water quality necessary for these uses.

The program is flexible, not static, and is intended to reflect the needs for the present situation as currently determined, but changes in water characteristics, pollution load, or water uses may require revision from time to time.

The essential elements of the program as developed by Minnesota consist of the following:

1. Provide the following improvements at the earliest date:

   (a) Construction of a sewage treatment plant at International Falls.

   (b) Installation of additional waste control facilities by the Minnesota-Ontario Paper Company to control the fiber and wood solids.

2. Operate all existing municipal and industrial waste treatment works at a uniformly efficient and high level in order to obtain the maximum benefits from these structures and permit their most effective utilization.

3. Control new or increased sources of pollution by providing adequate treatment.

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